

Year Group	6
Term	Spring Term
Subject	DT

Topic	Wind Turbines
Curriculum Intent	Children will research, design, make and evaluate a model of a wind turbine.

Key Vocabulary	Wind turbine, rotary blade, renewable energy, non-renewable energy, nacelle, generator, power cables, tower.
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skills	Know how to reinforce and strengthen a 3-D framework; assemble, join and combine materials and components with some accuracy; demonstrate resourcefulness when tackling practical problems; understand and use mechanical systems in their products; select from and use a wide range of materials and components according to their functional properties and aesthetic qualities; measure, mark out, cut and shape materials and components with some accuracy; demonstrate resourcefulness when tackling practical problems; share and clarify ideas through discussion; model their ideas using prototypes and pattern pieces; use annotated sketches, cross-sectional drawings and exploded diagrams to develop and communicate their ideas; understand and use mechanical systems in their products; select from and use a wide range of materials and components according to their functional properties and aesthetic qualities; measure, mark out, cut and shape materials and components with some accuracy ;demonstrate resourcefulness when tackling practical problems; critically evaluate the quality of the design, manufacture and fitness for purpose of their products as they design and make; identify the strengths and areas for development in their ideas and products.
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Knowledge	Investigate the use of wind turbines - how innovative, how sustainable and what impact they have beyond their intended purpose What is wind power? Where are the windiest places? What is a wind turbine? What are the advantages / disadvantages of getting energy from the wind? Understand that triangles create strong structures.
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Spring 1 MTP

Week	Learning Objective	Activities	Differentiation	Outcome
1	To research the structure and design of wind turbines	Investigate the use of wind turbines - how innovative, how sustainable and what impact they have beyond their intended purpose. Introductory discussion about wind turbines and the function: What is wind power? Where are the windiest places? What is a wind turbine? What are the advantages / disadvantages of getting energy from the wind? Using a selection of pictures of wind turbines, children work in small groups to identify key structural features of wind turbines. What similarities and differences do they have? Introduce vocabulary for parts of a wind turbine and talk through basic structure. Vocabulary: rotary blade, nacelle, generator, power cables, tower. Children label a simple diagram of a wind turbine to embed the use of vocabulary and explain how the wind turbine works. Energy from the wind power point Wind turbines power point Has pictures of different wind turbines and labelled diagram Video to explain how a wing turbine generates electricity – How does a wind turbine work? https://m.youtube.com/watch?v=DILJwsFI3w Learn About Wind Farms Caitie's Classroom Science For Kids https://m.youtube.com/watch?v=U5_cZ3IRUkU Tallest Wind Turbine in the U.S. installed at West Texas A&M University https://m.youtube.com/watch?v=wwwdjZF_a-o		Children will learn the vocabulary associated with the parts of a wind turbine and draw one.

2	To make simple models of wind turbine base structures.	Explain that a wind turbine needs to have a strong structure so that it is stable in windy conditions. Children work in small groups to try and create a tall tower that won't blow over in the wind. Measure to see which group has the tallest tower and use a fan or waft a large piece of cardboard to create wind. A4 scrap paper (give each group the same amount) and tape. Share the different structures used at the base of the wind turbine tower- monopile, tripod and jacket. Discuss why these are strong structures. Compare to other towers – e.g. electricity pylons Eiffel Tower which use similar shapes. Use Geo-strips to show how to reinforce by making triangles. Wind turbines power point Has base structures and examples of pylons towers and other buildings that use triangles to make them stronger		Chn use their knowledge of strong structures to create the tallest tower.
3	To research and develop design ideas for rotary blades.	Start the session with a simple demonstration of how the rotary blades work on a wind turbine - toy windmill Create blades and fix to a small straw with tape. Feed this into a larger straw and hold the larger straw so that the small straw can rotate. Test with a fan – or by walking along with the windmill in front of you. Children should be able to measure out their own square of card and mark on the lines to cut Experiment with other materials or designs for the blades. • Card / plastic sheets • scissors • glue stick • straws of different sizes • electric fan https://m.youtube.com/watch?v=xUpCuwf3JEg https://m.youtube.com/watch?v=4ufBW5Cfpgw These videos are useful for making the rotary blades but are fixed in a different way. Using two different sized straws is safer.		Children will experiment with different materials and designs for blades.
4	To develop a design for a model wind turbine	Children plan out their designs for a small prototype of a wind turbine. Set the design criteria as a class e.g.		Children will create design

		1. It needs to have a strong secure base 2. The blades must turn in windy conditions 3. The turbine should be able to create enough energy to lift a small weight. Encourage them to annotate their diagrams explaining their choices in detail. Have a selection of materials and tools available for the children so they can use these when designing. https://m.youtube.com/watch?v=vmM5kO2PjCo		criteria for their wind turbine.
5	To make a model wind turbine	Children work on their designs. Encourage them to modify and adapt the design if needed. • Card / plastic sheets • scissors • glue stick • straws of different sizes • electric fan		Children will make their wind turbine
6	To evaluate their finished wind turbines	Once complete look back at the design criteria and ask children to evaluate. 1. It needs to have a strong secure base 2. The blades must turn in windy conditions 3. The wind turbine must be able to generate electricity Children will then need to evaluate what has worked well and what improvements could be made to improve the design further. Ensure the children support their evaluations with detail.		Children will evaluate their wind turbine